CONSERVATION AGRICULTURE SERVICE CENTER (DALRM/GDA/MAFF)

Planting green!

The advanced cultivation technique for sustainable crop production

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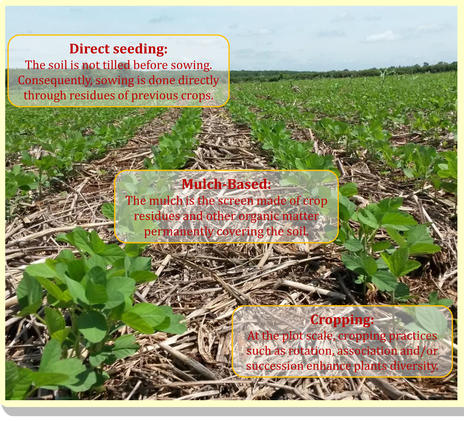

CONTEXT

Direct Seeding Mulch-based Cropping (DMC) systems are based on 3 key principles: (i) minimum soil disturbance, (ii) permanent soil protection and (iii) crops and cover/relay crops diversification. These principles are translated into ecological processes with a litter system, a continuous flow of fresh organic matter, driving soil biota activity, soil structure and soil organic C and N accumulation. The use of herbicide and the requirement on the implementation of operational sequences (rolling and spraying cover crops at 30 prior the establishment of main crops) are generally emphasized as the main bottlenecks to disseminate and adapt DMC systems to context.

IMPROVING CROP PRODUCTIVITY AND PROFIBATILITY WHILE REDUCING INVESTMENT COST THROUGH PLANTING GREEN TECHNOLOGY

Our goal is to develop a new generation of DMC systems based on the establishment of main crops (rice, soybean, cassava, maize, and other pulse crops) on the living cover crops to improve the efficiency of the system (less use of fossil fuel, higher flexibility, lower operational costs, eliminate the use of herbicide…). Planting green technology reduces the operational sequences for the main crop establishment, eliminate the use of herbicide (both pre and post applications) while enhancing profitability and environmental quality.

OPERATIONAL SEQUENCES OF MAIZE CULTIVATION UNDER PLANTING GREEN TECHNOLOGY

RICE DMC SYSTEM USING SEED BROADCASTING TECHNOLOGY

BENEFITS AND SYSTEM'S EFFICIENCY

Assessment of the system suggested that the planting green technology reduces the operational sequences as all operations are done the same day (rolling the cover crops and sowing the main crops), require less energy, and decrease production costs. The system makes possible to plant through living, standing, mix of cover crops (combining grasses, legumes, among others genus) without compromising main crop establishment. It also enables to extend the growing period of cover crops increasing the quantity of biomass that returns to the soil, reduce evaporation rate, and slow down the process of decomposition of the cover crops leading to better weeds management across the cropping period. These innovative cropping systems open ways to higher flexibility, enhance profit and environmental quality while engaging CA practices towards organic management.

CHALLENGES

- Assess different combinations of cover crops for diversed cash crops (soybean and pulse crops)
- Improve the efficiency of roller crimpers for cover crop control
- Include additional tools such as biological control agents, biochar, thermophosphate on seed coating.
- Assess the cost and efficiency of the use of different size and type of agricultural machineries for different planting green systems and different contexts (flood plains, irrigation scheme, upper terraces)

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